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None

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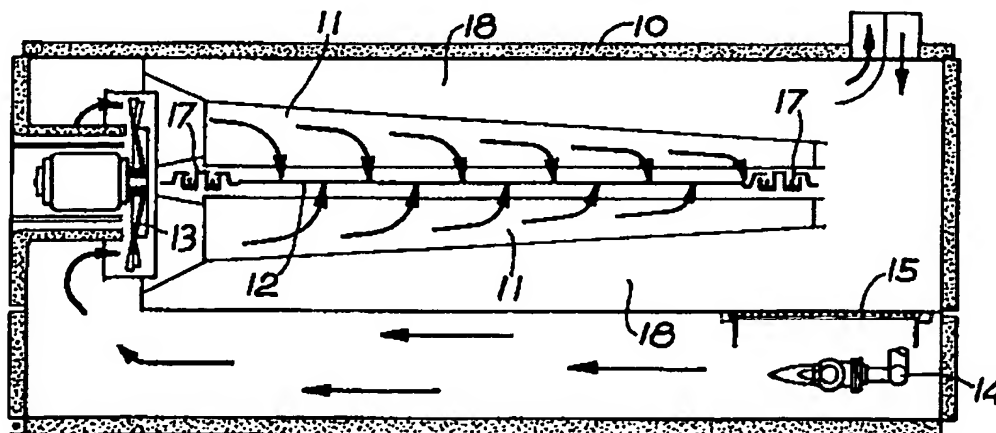
(58) Field of search

F4G

(54) Method and apparatus for preventing damage to fabric webs during fabric treatments using flowing treatment agents

(57) The present invention provides a means of preventing over-drying, over-setting or burning of fabric web (12) or parts of the fabric web when the movement of the web through a fabric treatment chamber (18) is interrupted whereby the fabric (12) comes substantially to a standstill in the treatment chamber (18), more particularly in a stretching frame, drying or setting devices (including heater 14), in which the fabric web (12) is held by tentering chains (17) or the like and moved through the treatment chamber (18), treatment agent (e.g. hot air) being blown onto the fabric web (12) through nozzles located above and below the fabric web (12) in nozzle housings (11), the treatment agent being removed from the fabric web (12) through drainage chambers between the nozzle housings (11), the introduction and removal of the treatment agent being carried out by a fan (13) connected to both the nozzle housings (11) and the drainage chambers. More particularly in the present invention when the fabric web (12) comes to a standstill in the treatment chamber (18), the blowing of the treatment agent onto the fabric web (12) is interrupted while a reverse treatment agent flow serves to maintain the treatment temperature as well as the temperature of other elements in the treatment chamber (18) is maintained by the fan (13) through the treatment chamber (18). A coarse sieve (16) is preferably provided in addition to the main sieve (15) to trap fluff when the treatment agent flow is reversed.

Fig. 1



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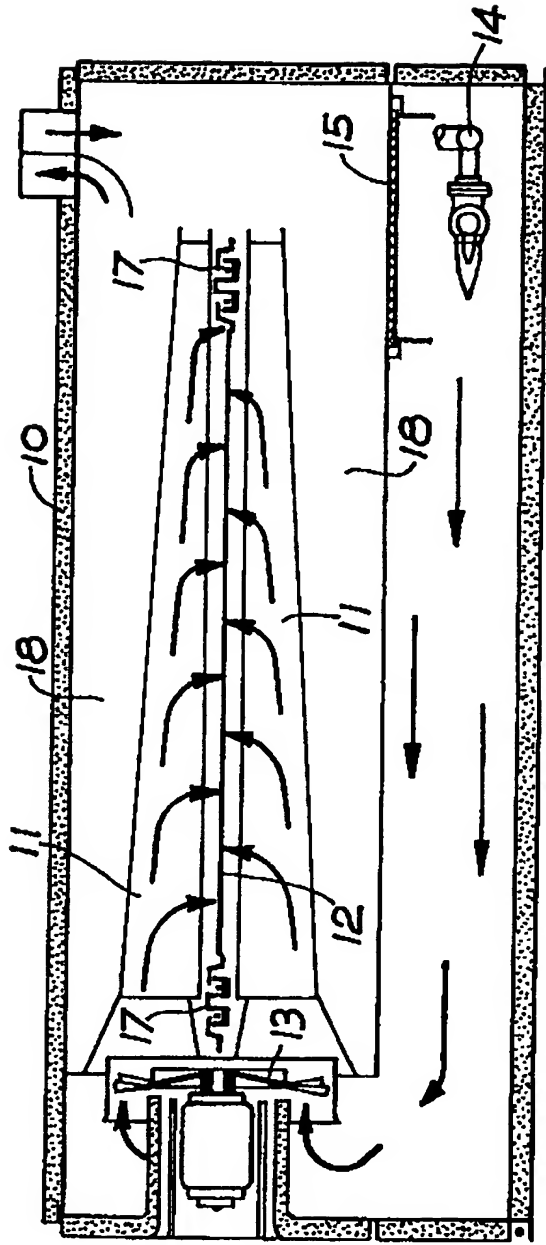


Fig. 1

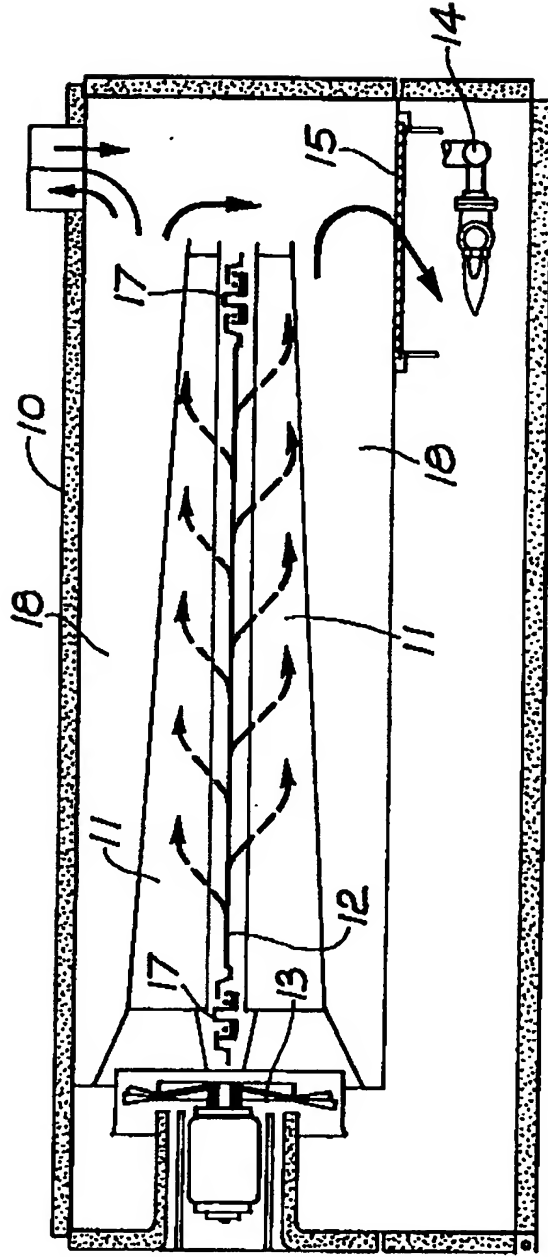


Fig. 2

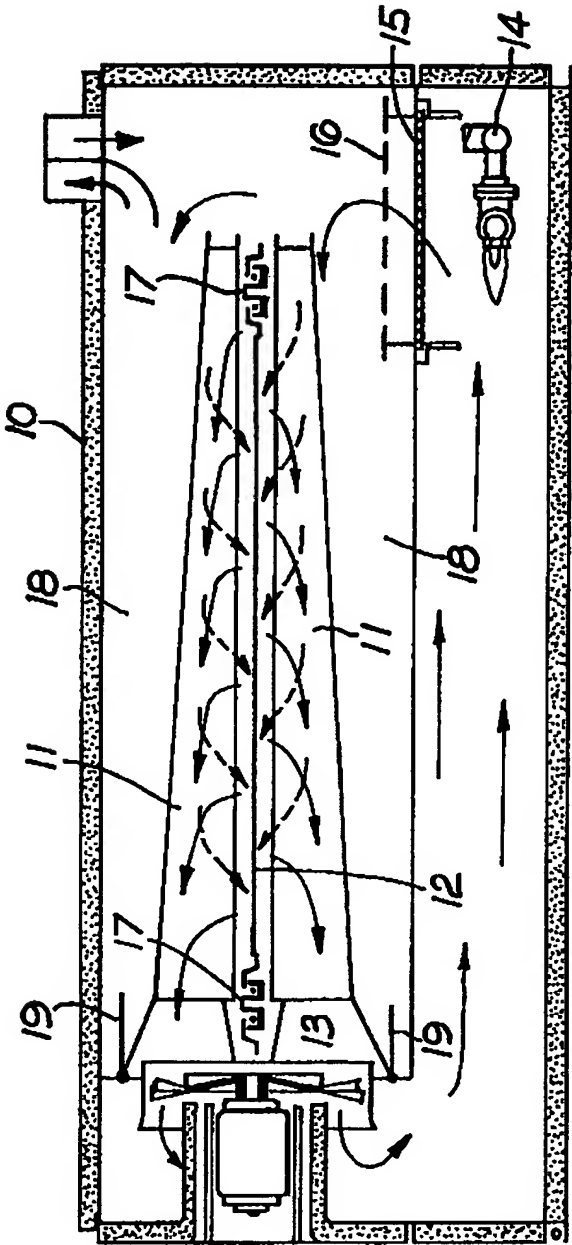


Fig. 3

SPECIFICATION

Method and apparatus for preventing damage to fabric webs during fabric treatments using flowing treatment agents

The present invention relates to the treatment of fabric and more specifically to a method and apparatus for preventing the over-drying, over-setting or burning of fabric webs or parts of fabric webs when the movement of the fabric web through a fabric treatment chamber is interrupted, i.e. when the fabric web has come to a standstill in the treatment chamber, more particularly in a stretching frame, drying or fixing devices in which the fabric web is held by tentering chains and moved through a treatment zone, treatment agent being blown onto the fabric web by nozzles located in nozzle housings above and below the fabric web in the treatment zone, and removed from the fabric web again through drainage chambers between the nozzle housings, the introduction and removal of the treatment agent being carried out by a group of fans connected to both the nozzle housings and the drainage chambers.

In order to prevent damage to the fabric webs through the introduction of the treatment agent, it is known that when the chain of a stretch frame comes to a standstill the gas burners (heaters) and also the fans are to be automatically switched off. As a result the treatment device becomes cooled down to such an extent when operations are resumed that at first—until the system has been fully reheated—the fabric web is treated at too low a temperature, e.g. is not properly set during the setting process.

In order to overcome these disadvantages it has already been proposed that regulating flaps be provided at the entrance to the nozzle finger (main housings), which are closed when the fabric web is at a standstill, so that no more treatment agent can flow to the nozzles and thence onto the fabric web, and in addition by-pass valves can be provided in the transition portion which are then opened so that a circulation of the treatment agent in the treatment chamber is maintained. As there is no flow through the nozzle fingers when the regulating valves are closed, the temperature here will drop with the result that the intended maintenance of the temperature is not fully achieved. It is, however, a great disadvantage that a multiplicity of regulating and shut-off valves is required which have to be operated, which is costly and can lead to technical failure, particularly as when the regulating valves at the entrance to the nozzle fingers are re-opened they have to be set exactly to the position before closing, which requires considerable technical expense.

The present invention is intended to solve the problem of maintaining the temperature in

the treatment chamber without great additional technical costs when the fabric web has come to a standstill during the heat treatment, and substantially avoiding the damaging effect of introducing treatment agent onto the fabric web.

According to one aspect of the present invention there is provided a method of preventing over-drying, over-setting or burning of fabric web or parts of the fabric web when the movement of the web through a fabric treatment chamber is interrupted whereby the fabric comes substantially to a standstill in the treatment chamber, more particularly in a stretching frame, drying or setting devices, in which the fabric web is held by tentering chains or the like and moved through the treatment chamber, treatment agent being blown onto the fabric web through nozzles located above and below the fabric web in nozzle housings, the treatment agent being removed from the fabric web through drainage chambers between the nozzle housings, the introduction and removal of the treatment agent being carried out by a fan means connected to both the nozzle housings and the drainage chambers, wherein when the fabric web comes to a standstill in the treatment chamber, the blowing of the treatment agent onto the fabric web is interrupted while a treatment agent flow serving to maintain the treatment temperature as well as the temperature of other elements in the treatment chamber is maintained through the treatment chamber.

Preferably when the fabric web comes to a standstill, a reversal in the rotary direction of the fan means and therefore the direction of flow of the treatment agent through the treatment chamber and treatment devices is achieved automatically.

Preferably further, the reversal in the direction of rotation of the fan means is combined with a reduction in the speed of the fan means.

In a preferred embodiment, the treatment agent flow is controlled by additional shutter flaps for the drainage chambers provided at a transition part of the nozzle housings when the fabric web is at a standstill and the flow is reversed.

A main fluff sieve can be provided to trap fluff carried by the treatment agent.

In order to prevent the fluff which has been carried along by the treatment agent during the heat treatment and trapped in the main fluff sieve from coming away from the fluff sieve again and re-entering the treatment chamber when the direction of the flow is reversed, a secondary or coarse sieve is provided before the main fluff sieve when the treatment agent flows through normally or behind it when the direction of flow is reversed, by means of which the layer of fluff, which becomes compressed into a solid felt

like mass, is trapped when lifted from the main fluff sieve.

According to a further aspect of the present invention there is provided apparatus for treating fabric webs comprising a treatment chamber, means for moving a fabric web to be treated through the treatment chamber, nozzle housings including nozzles located above and below the fabric web for discharge of treatment agent onto the fabric web, drainage chambers for the treatment agent between the nozzle housings, fan means connected to both the nozzle housings and the drainage chambers and serving for the introduction and removal of the treatment agent in the apparatus, and temperature control means for the creation of flow of treatment agent which serves to maintain the treatment temperature and also the temperature of other elements in the treatment chamber at a desired level when the fabric web is stationary within the treatment chamber.

The present invention will enable all the parts of the stretching frame drier to remain at the correct temperature together with the nozzle housings as these too are completely within the main flow of the treatment agent, in contrast to prior proposals. Technical costs are lower as no substantial additional technical means are required and automisation can be achieved through simple electrical sequential switching. As the fans operate with a reduced circulation of treatment agent when reversed, the fan speed being reduced, electricity consumption is lower during this phase.

An embodiment of the present invention will now be described with reference to the accompanying drawings in which:

Figure 1 illustrates in cross-sectional elevation fabric drying apparatus showing the path of the heated treatment agent to the fabric web during normal operation,

Figure 2 shows the path of the cooled treatment agent from the fabric web back to the heater during normal operation,

Figure 3 shows the path of the treatment agent through the treatment chamber when the drier fans are in reverse.

In the figures the same parts are given the same reference numeral.

Referring to the drawings, in a drier casing 10 of known construction there are nozzle housings 11 which have nozzles on the side facing the fabric web 12 through which the treatment agent is blown onto the fabric web by means of fans 13, as can be seen from Fig. 1. The fabric web is carried through the treatment chamber by means of tentering chains 17.

After treatment and as shown by the broken arrows in Fig. 2, the treatment agent is removed from the fabric web through drainage chambers between the nozzle housings 11 and is eventually returned to the fans via heating devices 14. In order to trap fluff that

has been carried along by the treatment agent a fluff sieve 15 is provided in the path of the treatment agent.

When the chains 17 are stopped so that the fabric web 12 comes to a standstill, the direction of rotation of the fans 13 is reversed and speed reduced in the operating condition shown in Fig. 3, so that the reverse flow directions of the treatment agent indicated by arrows in this figure are achieved. It can be seen that there is no longer an introduction of the treatment agent onto the fabric web 12, as the treatment agent flowing through the drainage chambers is sucked through the fan nozzles. In addition the temperature is maintained by the reversal of the treatment agent. A secondary or coarse sieve 16 is provided to prevent fluff which has been carried along by the treatment agent during the heat treatment and trapped in the main sieve 15 coming away from the sieve 15 and re-entering the treatment chamber 18 when the direction of flow is reversed: the sieve 16 can be located before or behind the sieve 15 as appropriate.

CLAIMS

1. A method of preventing over-drying, over-setting or burning of fabric web or parts of the fabric when the movement of the web through a fabric treatment chamber is interrupted whereby the fabric comes substantially to a standstill in the treatment chamber, more particularly in a stretching frame, drying or setting devices, in which the fabric web is held by tentering chains or the like and moved through the treatment chamber, treatment agent being blown onto the fabric web through nozzles located above and below the fabric web in nozzle housings, the treatment agent being removed from the fabric web through drainage chambers between the nozzle housings, the introduction and removal of the treatment agent being carried out by a fan means connected to both the nozzle housings and the drainage chambers, wherein when the fabric web comes to a standstill in the treatment chamber, the blowing of the treatment agent onto the fabric web is interrupted while a treatment agent flow serving to maintain the treatment temperature as well as the temperature of other elements in the treatment chamber is maintained through the treatment chamber.

2. The method according to claim 1 wherein when the fabric web comes to a standstill, a reversal in the rotary direction of the fan means and therefore the direction of flow of the treatment agent through the treatment chamber and treatment devices is achieved automatically.

3. The method according to claim 1 wherein when the fabric web comes to a standstill the speed of the fan means is reduced to a level ensuring that the treatment temperature is maintained.

4. The method according to claims 2 and 3 wherein the reversal in the direction of rotation of the fan means is combined with a reduction in the speed of the fan means.

5 5. The method according to claims 1, 2 or 4 wherein the treatment agent flow is controlled by additional shutter flaps for the drainage chambers provided at a transition part of the nozzle housings when the fabric web is at a standstill and the flow is reversed.

10 6. The method according to any one of the preceding claims wherein in the main stream of the treatment agent with a normal direction of flow a secondary or coarse sieve is provided in front of a main fluff sieve, or
15 behind it when the direction of flow is reversed.

7. Apparatus for treating fabric webs comprising a treatment chamber, means for moving a fabric web to be treated through the treatment chamber, nozzle housings including nozzles located above and below the fabric web for discharge of treatment agent onto the fabric web, drainage chambers for the treatment agent between the nozzle housings, fan means connected to both the nozzle housings and the drainage chambers and serving for the introduction and removal of the treatment agent in the apparatus, and temperature control means for the creation of a flow of treatment agent which serves to maintain the treatment temperature and also the temperature of other elements in the treatment chamber at a desired level when the fabric web is stationary within the treatment chamber.

8. Apparatus according to claim 7, wherein said temperature control means serves to set the fan means for reverse operation for maintenance of said desired temperature of the fabric web and the other elements.

9. Apparatus according to claim 7 or 8, wherein said temperature control means serves to set the fan means for operation at a reduced speed.

10. A method for preventing over-drying, over-setting or burning of fabric web in treatment apparatus as claimed in claim 1, and substantially as hereinbefore described.

11. A fabric web treated by the method of any one of claims 1 to 7 or claim 10.

12. Fabric treatment apparatus substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.